Salisbury University's

Presidential Citizen Scholars Program

PCS WHITEPAPER

BIOREMEDIATION OF URBAN RUNOFF AT BISM

Charles Grayson Laird, Senior

Christoper Bryce Machalek, Junior

Emma Tarquinio, Senior

PCS 2023 cohort

MEET THE SCHOLARS

Charles Grayson Laird
Senior, Elementary Education major. Class of Spring 2023. Member of Kappa Delta Pi Educational Honors Society.

Christoper Bryce Machalek
Junior, Biology Major on Biotech track, Class of 2024, CHC Honor's Ambassador, Vice President of Starnet Society.

Emma Tarquinio
Senior Political Science major, Environmental Studies minor, graduate class of Fall 2023. Archival Assistant with NABB Center, member of Delta Alpha Pi International Honor Society, and Pi Sigma Alpha, the National Political Science Honorary Society.

Health of the Chesapeake Bay

Impervious surfaces are constructed materials that prevent rainwater from passing through and are a major contributor to pollution, urban heat islands, climate change, and other notable environmental issues today (Salerno, et al., 2018). Most traditional infrastructure systems, like parking lots and roads, are known as 'gray' infrastructure. Gray infrastructure significantly changes the physical landscape, impacting the environment and delivering high maintenance costs (Oijstaeijen, et al., 2020).

Gray systems, including impervious surfaces, are the most common infrastructure built, and they are inefficient at mitigating stormwater runoff, flooding, and pollution (White, 2022). The impervious surfaces in gray systems exacerbate the issue of urban runoff on the Delmarva Peninsula as excess oil, acids, and sediment pollutants all settle on roads, sidewalks, roofs, and parking lots, which are then washed into water drains and larger bodies of water through ditches, streams, and rivers. Urban runoff in the City of Salisbury and Wicomico County ultimately ends up washing into the Chesapeake Bay Watershed, disrupting organisms and the ecosystem (Pollack, 2022).

The Chesapeake Bay is Maryland's most valuable natural resource; it provides many residents of the Eastern Shore with a means of livelihood and employment. As a result, urban runoff from Salisbury is directly tied to the health and economic stability of the Eastern Shore (Hastings, 2022).

The Chesapeake Bay has been visibly struggling with pollutants since the 1970s. Environmental and Bay specialist, Jerry Schubel, notes that the future of the Chesapeake Bay will be determined "through a combination of nature and human action" (Schubel, 2021, p. 1). Community efforts to remedy the environmental crisis in the local context of Salisbury are making an impact on the health of the Chesapeake Bay.

There are many individuals and organizations working on creative solutions, but more can be done through collaborative partnerships with students at local colleges and universities. One such solution is bioremediation, which is the practice of removing impervious gray infrastructure like pavements and parking lots and replacing them with native green infrastructure such as native bushes, trees, and plants.

Global Bioremediation Efforts

Global efforts regarding sustainable development and redevelopment, including the bioremediation of impervious surfaces, have been gaining more attention and momentum over the past decade. Learning about these global efforts has served as an inspiration throughout our Presidential Citizen Scholars Capstone Project.

An example of a project that is one of the first of its kind was led by a group of engaged citizens in Peterborough, Ontario, Canada. Volunteers worked together at Water Street to depave a parking lot that was not being used. This effort has been called the “largest project of its kind in Canada” (Corrigan, 2019).

Another significant inspiration has been Depave, a progressive nonprofit in Portland, Oregon which has been championing urban depaving. Depave works to redevelop urban spaces to take them from "parking lots to paradise" through "constructive destruction" (Depave, 2023). Depave's collective mission is to “empower disenfranchised communities to overcome social and environmental injustices and adapt to climate change through urban re-greening”. Investigating Depave's previous re-greening projects informed our approach to this project.

Local Bioremediation Efforts

According to William White, Transportation Manager with the City of Salisbury, any small steps that can be taken to transform impervious parking lots into green spaces will benefit the environment, the economy, and the Salisbury community (White, 2021). According to Wicomico's Municipal Separate Storm Sewer System Annual Progress Report (MS4, 2019), there is a total of 3,400.77 impervious acres in Wicomico County, which includes the Salisbury area. The report states the County's plan is to address 20% of the total impervious land in the County as part of the restoration requirement, which includes bioremediating 667.86 of the initial 3,400.77 acres by 2024.

Bioremediation efforts in the City of Salisbury and Wicomico County will continue to demand collaboration and creativity from our governmental agencies, nonprofit organizations, and citizens in the local community (White, 2022). Our PCS project was designed to operate within this intersectional space to ensure that our efforts would extend beyond SU's Presidential Citizen Scholars Program to make an immediate environmental impact and leave a legacy for other SU students and community members to follow.

Why the BISM Site?

Many parts of the City of Salisbury and Wicomico County experience chronic flooding from urban runoff and rising sea levels (White, 2021). Fitzwater Street in Downtown Salisbury, MD experiences regular sunny day flooding due to its location adjacent to the Wicomico River, and other parts of the City and County are equally as susceptible.

In order to generate the greatest civic impact through our bioremediation project, it was essential that we were able to locate a nonprofit organization doing vital work in the community, which was also perpetually impacted by flooding and urban runoff. Mr. White and Prof. Weaver pointed our group toward the Northeast side of Salisbury, MD, and the nonprofit, Blind Industries and Services of Maryland (BISM).

BISM is a nonprofit organization "dedicated to providing career and training resources to blind residents of Maryland" (BISM, 2023). At its location on Old Ocean City Road, BISM employees focus on CAD/CAM cutting and sewing of textiles for uniforms (Bishop, 2022). This specific BISM site has a large amount of impervious surfacing because it was previously the location of the first Lowe's Home Improvement store in Wicomico County. The original development of the property has caused an inordinate amount of urban runoff and flooding on site and nearby.

Bioremediation of Urban Runoff at BISM

Bioremediation & Sustainability

Once we established a collaborative partnership with the City of Salisbury and BISM, we began working on the infrastructure and stormwater design of the bioremediation area with William White and Rich Bishop. The mapping design with the Eastern Shore Regional GIS Cooperative (ESRGC) helped us visualize the project's impact and support our grant-seeking work.

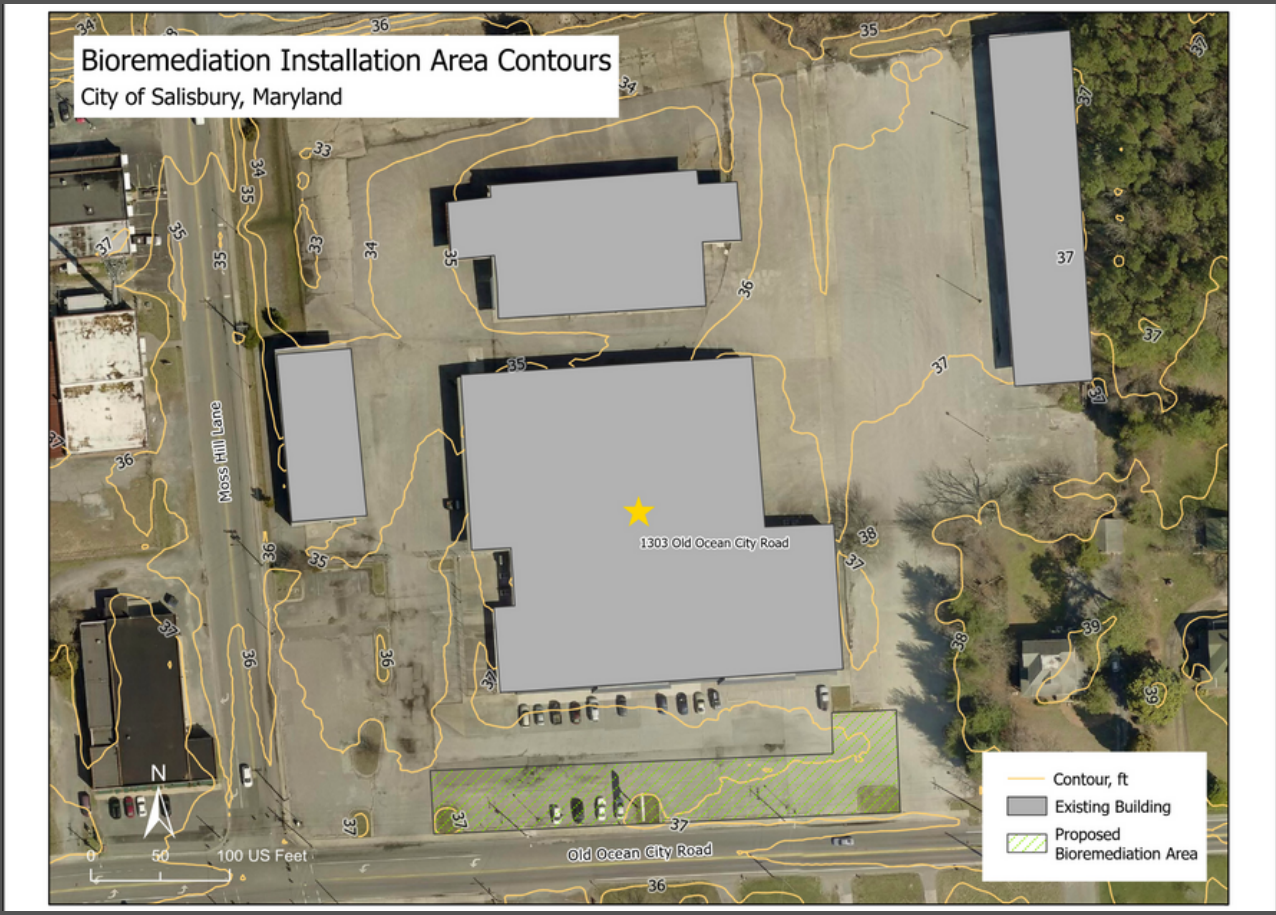
Amanda Pollack of the Center for Watershed Protection and Beth Sheppard of the Lower Shore Land Trust provided direction and guidance, while the leaders at Salisbury University's ShoreCorps/Americorps Program, Lower Shore Land Trust, and the Chesapeake Bay Trust provided funding for our Capstone Project.

The impervious surfacing is scheduled to be removed by the City of Salisbury's Field Ops team in May 2023. The pavement without steel will be repurposed by a pavement company, in-fill soil will be added to the site, and grass will be seeded as part of this phase. Through our grant partnership with ShoreCorps, rain barrels will be installed at a community event at BISM on June 21st. The rain barrels will ensure that rainwater from BISM's roof will help water the plants and grass.

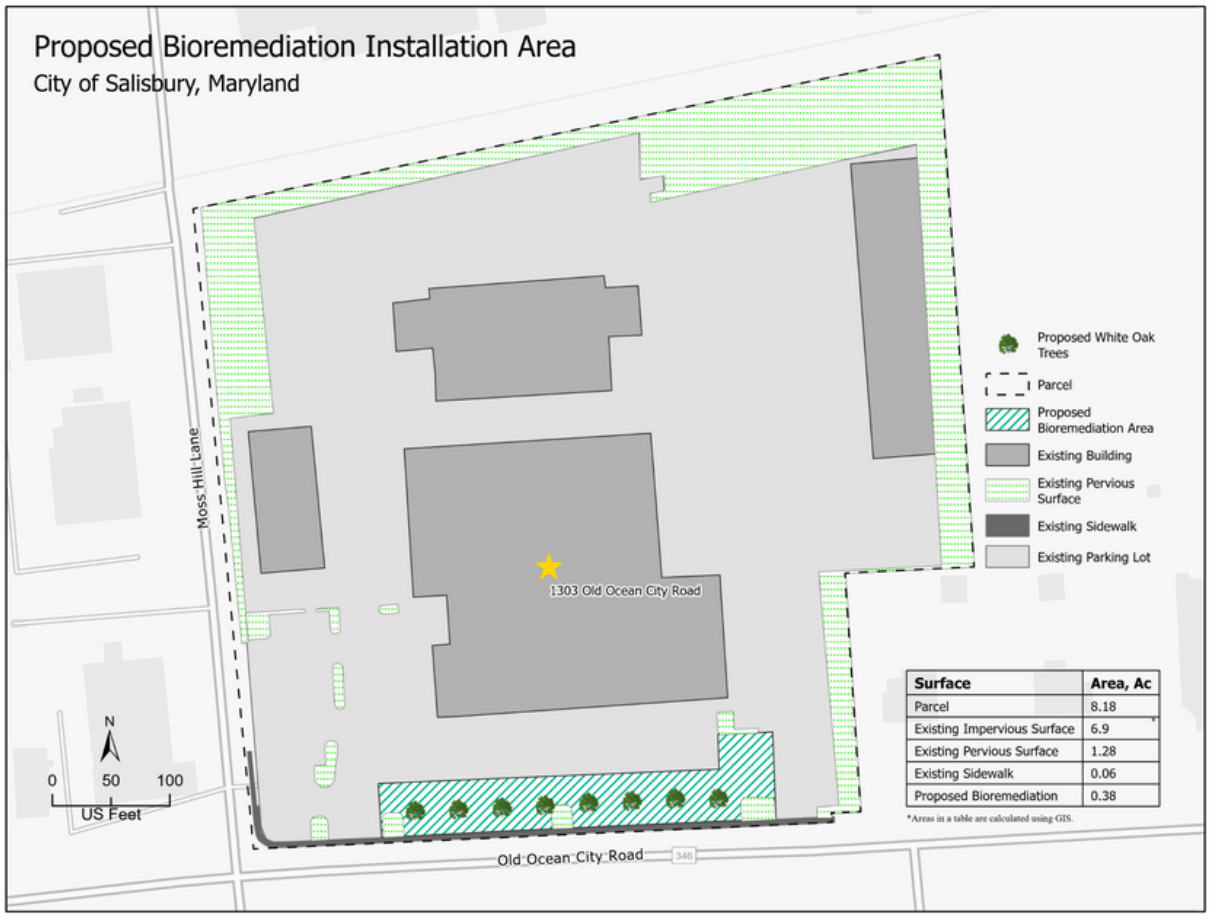
We are working with Lower Shore Land Trust, the City of Salisbury, Chesapeake Bay Trust, and Salisbury University to host a tree-planting (including 8 native white oak trees and other native species) event in the last week of September 2023 to commemorate the completion of the project. The event will also include a ribbon-cutting to publicly unveil the redesign of the BISM site.

In addition to the environmental benefits that this project is making in the community, bioremediating 16,000 sq. ft. of impervious surfacing at this BISM site will also lead to a significant reduction in BISM's annual taxes for the amount of impervious surfacing for this high-impact nonprofit (Maryland House Bill 987, 2013). These savings will enable BISM to continue their work providing jobs and resources for those experiencing blindness in the State of Maryland.

Our PCS Capstone Project will have a lasting impact on the City of Salisbury and BISM. We were awarded around $7,000 in grants to fund the depaving and the installation of rain barrels and trees. The bioremediation area will help beautify the site and offset urban runoff and flooding in the surrounding neighborhood. We are hopeful that future SU students and PCS Scholars will follow our lead.



Contour Map of BISM highlighting elevation and runoff (provided by ESRGC)



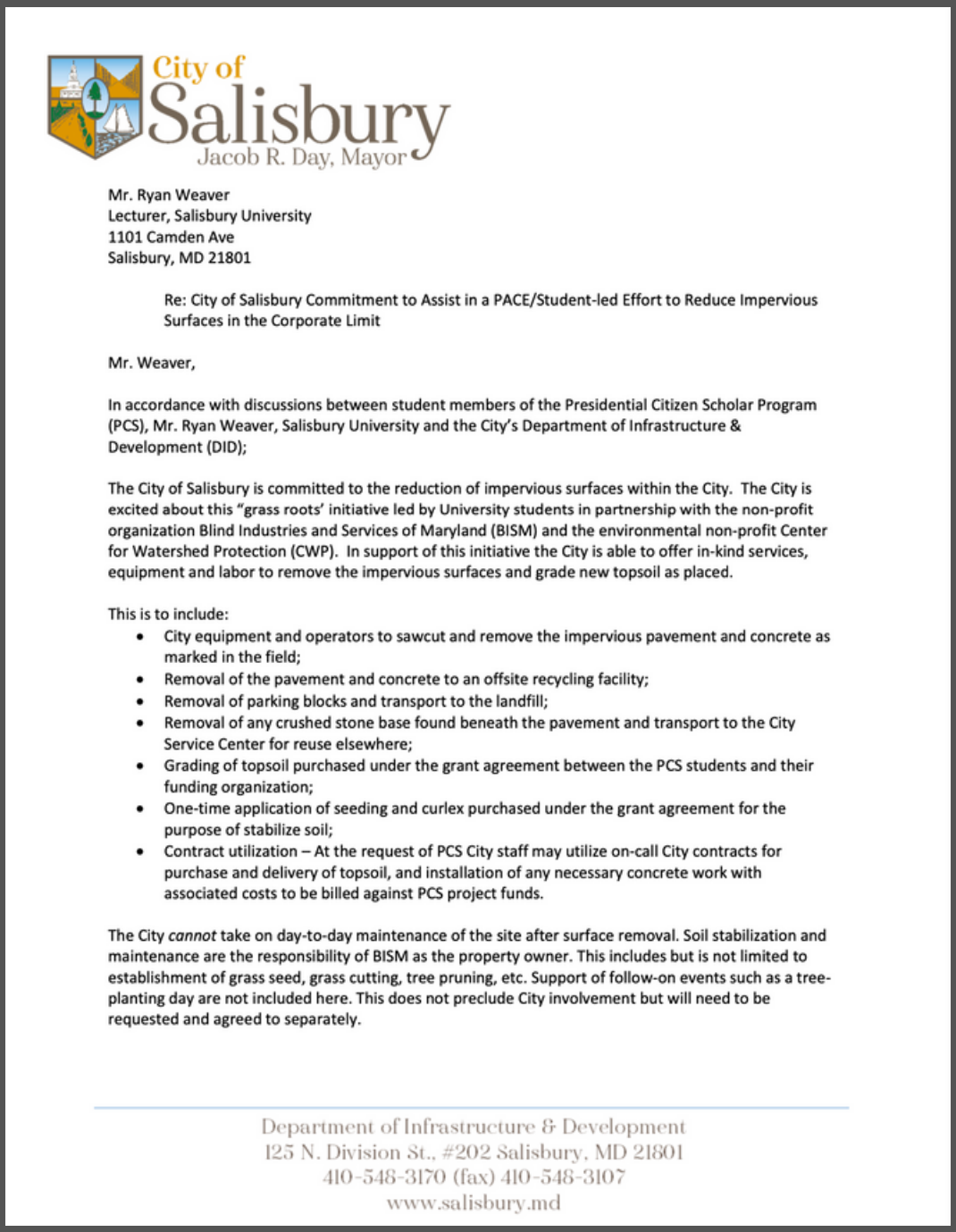
Proposed Bioremediation Map of BISM site (provided by ESRGC)

Bioremediation Project Events on the Horizon

May 2023 -
removal of impervious surfacing, in-fill soil, grass seeding

June 21, 2023 -
rain barrel installation and community event

Last Week of September 2023 -
commemoration event (tree-planting & ribbon-cutting)



City of Salisbury
Jacob R. Day, Mayor

Mr. Ryan Weaver
Lecturer, Salisbury University
1101 Camden Ave
Salisbury, MD 21801

Re: City of Salisbury Commitment to Assist in a PACE/Student-led Effort to Reduce Impervious Surfaces in the Corporate Limit

Mr. Weaver,

In accordance with discussions between student members of the Presidential Citizen Scholar Program (PCS), Mr. Ryan Weaver, Salisbury University and the City's Department of Infrastructure & Development (DID);

The City of Salisbury is committed to the reduction of impervious surfaces within the City. The City is excited about this "grass roots' initiative led by University students in partnership with the non-profit organization Blind Industries and Services of Maryland (BISM) and the environmental non-profit Center for Watershed Protection (CWP). In support of this initiative the City is able to offer in-kind services, equipment and labor to remove the impervious surfaces and grade new topsoil as placed.

This is to include:

- City equipment and operators to sawcut and remove the impervious pavement and concrete as marked in the field;
- Removal of the pavement and concrete to an offsite recycling facility;
- Removal of parking blocks and transport to the landfill;
- Removal of any crushed stone base found beneath the pavement and transport to the City Service Center for reuse elsewhere;
- Grading of topsoil purchased under the grant agreement between the PCS students and their funding organization;
- One-time application of seeding and curlex purchased under the grant agreement for the purpose of stabilize soil;
- Contract utilization – At the request of PCS City staff may utilize on-call City contracts for purchase and delivery of topsoil, and installation of any necessary concrete work with associated costs to be billed against PCS project funds.

The City *cannot* take on day-to-day maintenance of the site after surface removal. Soil stabilization and maintenance are the responsibility of BISM as the property owner. This includes but is not limited to establishment of grass seed, grass cutting, tree pruning, etc. Support of follow-on events such as a tree-planting day are not included here. This does not preclude City involvement but will need to be requested and agreed to separately.

Department of Infrastructure & Development
125 N. Division St., #202 Salisbury, MD 21801
410-548-3170 (fax) 410-548-3107
www.salisbury.md

City of Salisbury
Jacob R. Day, Mayor

The City is available to meet with PCS, BISM, CWP or other entity or contractor as needed. William White is the City contact for this project can be reached at wwhite@salisbury.md or by calling 410-548-3170.

Signed:

Julia Glanz, City Administrator

11/17/2022
Date

Letter of Commitment from the City of Salisbury: **November 17, 2022**

March 9, 2023

Mr. Ryan Weaver
Director of Presidential Citizen Scholars
Salisbury University's Institute for Public Affairs and Civic Engagement
1101 Camden Avenue, Salisbury, MD 21801
Salisbury, MD 21801

Dear Mr. Weaver:

The Chesapeake Bay Trust (the Trust) thanks the Salisbury University's Institute for Public Affairs and Civic Engagement for your proposal to the Community Engagement and Restoration Mini Grant Program. I am pleased to report approval of $4,998 to remove impervious surface, plant the area with natives, and improve the issue of runoff in Salisbury neighborhoods.

Your award will be distributed as detailed in the award agreement attached. The payment(s) are contingent on key elements that are required prior to the release of each payment as described in your award agreement. **Please carefully read your award agreement** and contact the Trust if you have questions.

The signed award agreement, and any other contingencies, and final reports must be submitted by logging into the Chesapeake Bay Trust Online System accessed through the link https://www.grantrequest.com/SID_1520 with the same username and password used when you applied. The Trust reserves the right to cancel the award and apply funds to other projects if the requirements of the award agreement are not met by the due dates.

If you should have any questions regarding our decision, please feel free to contact the Program Officer Danielle Hamilton at (410) 974-2941 ext. 115. The Chesapeake Bay Trust greatly appreciates the time you invested in the proposal development and looks forward to working with you in the future.

Sincerely,

Jana Davis, Ph.D.
President

Award #: 21736
Project Leader: Miss Emma Tarquinio

108 Severn Avenue, Annapolis, MD 21403 ♦ (410) 974-2941 ♦ www.cbtrust.org

Community Engagement and Restoration Mini-Grant Award: **$4,998**

REFERENCES

William White, personal communication, 2022

F. Namwamba, personal communication, 2022

Rachel Manning, personal communication, 2022

Jana Davis, personal communication, 2022

Amanda Pollack, personal communication, 2022

Richard Bishop, personal communication, 2022

Kathy Somoza, personal communication, 2022

Sadie Drescher, personal communication, 2022

Josh Hastings, personal communication, 2022

Julia Glanz, personal communication, 2022

Beth Sheppard, personal communication, 2022

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THANK YOU!

Charles Grayson Laird, Christopher Bryce Machalek, and Emma Tarquinio would like to extend our appreciation to the following people who have given significant time and energy to support our Presidential Citizen Scholars Capstone Project over the past three semesters. Thank you for your support and guidance!

COMMUNITY LEADERS

William White
(Transportation Manager / Department of Infrastructure and Development, City of Salisbury)

Richard Bishop
(Operations Manager / Blind Industries & Services of Maryland in Salisbury)

Amanda Pollack
(Water Resources Engineer / Center for Watershed Protection)

Anastassiya Supernova
(GIS Analyst / Eastern Shore Regional GIS Cooperative)

Beth Sheppard
(Agricultural Outreach Specialist / Lower Shore Land Trust)

Danielle Hamilton
(Program Officer / Chesapeake Bay Trust)

Jana Davis
(President / Chesapeake Bay Trust)

SU CAMPUS LEADERS

Ryan Weaver
(PCS Director / Lecturer / Interdisciplinary Studies & PACE)

Alexander Pope IV
(Associate Professor / Secondary and Physical Education)

Carolyn Lepre
(President / Salisbury University)

Sarah Surak
(Associate Professor / Political Science / Environmental Studies)

THANK YOU!

Charles Grayson Laird, Christopher Bryce Machalek, and Emma Tarquinio would also like to extend our appreciation to these organizations who were instrumental in our PCS Capstone Project!

PACE

Institute for
Public Affairs and Civic Engagement
at Salisbury University

The Institute for Public Affairs and Civic Engagement (PACE) is a resource center where the SU community, local government, nonprofit and public groups can access knowledge and information. PACE draws on the interdisciplinary expertise of SU faculty, students, staff, and community partners. As a nonpartisan contributor, the Institute organizes projects and programs that are customized to fit the particular needs of the Eastern Shore community. For more information about PACE, visit www.salisbury.edu/pace (or email PACE@salisbury.edu).

PCS PRESIDENTIAL CITIZEN SCHOLARS PROGRAM

The PCS Program prepares students to be community leaders through civic scholarship and community action. Over three semesters, Scholars meet with members of the community to identify and research an issue that will culminate in a Capstone Project. Scholars are supported through Salisbury University's Institute for Public Affairs and Civic Engagement (PACE) and the Office of the President. SU's highest purpose is "to empower students with knowledge, skills, and core values that contribute to lifelong learning and active citizenship in a democratic society." This elite program builds on SU's highest purpose by offering students of all majors and disciplines the opportunity to engage in the life of the community, develop habits of democratic citizenship, and become experienced civic leaders. The PCS Program operates under the direction and guidance of Ryan Weaver, PACE/IDIS Lecturer (rvweaver@salisbury.edu).